

Dec. 16, 1930.

H. W. REEL

1,784,847

TILE FORMING MACHINE

Filed March 25, 1929

2 Sheets-Sheet 1

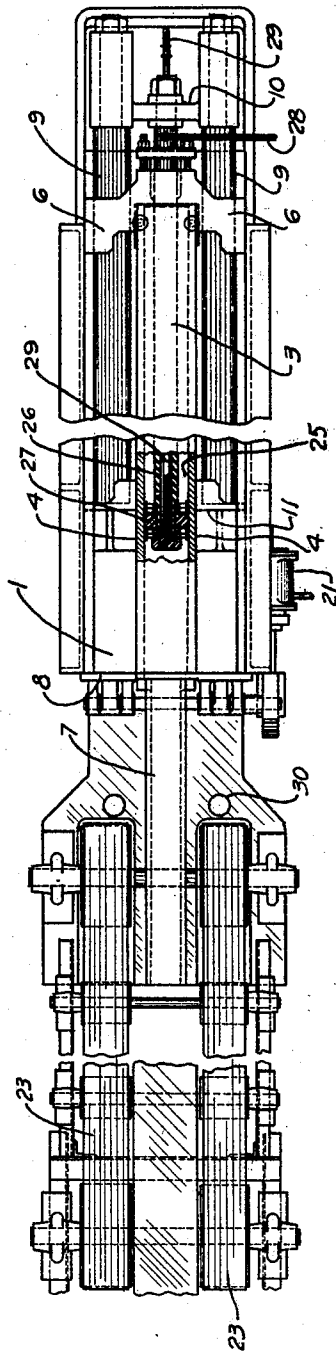


Fig. 1

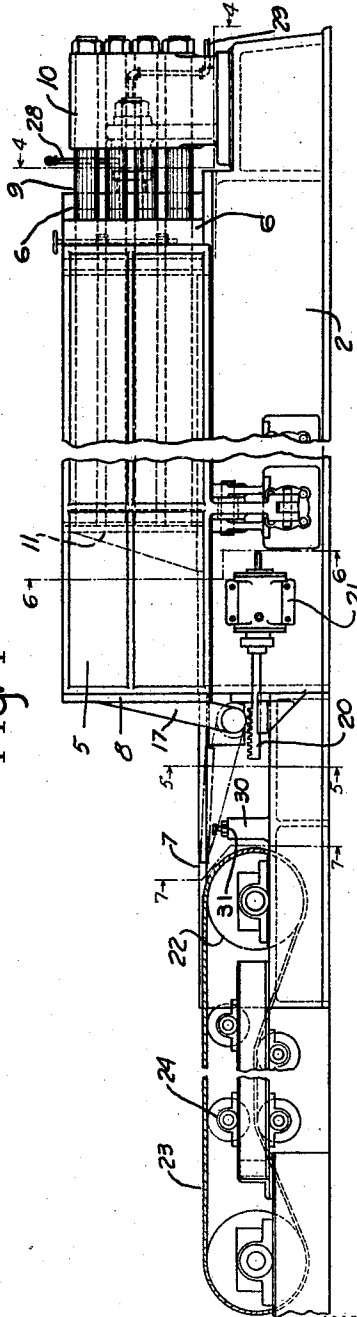


Fig. 2

INVENTOR
H. W. REEL

BY *L. A. Paley*
ATTORNEY

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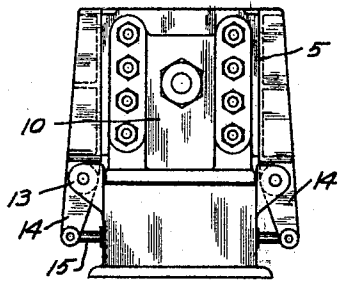


Fig. 3

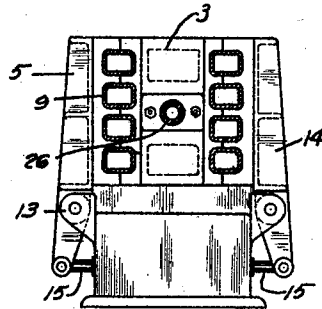


Fig. 4

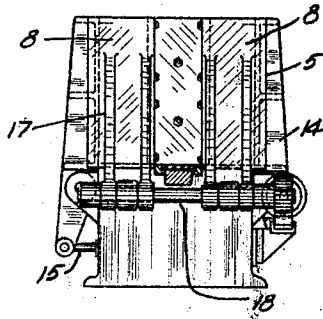


Fig. 5

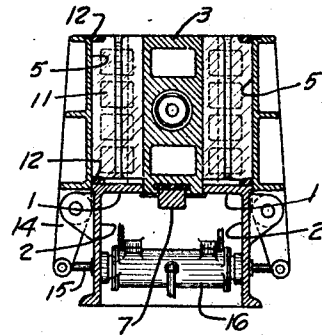


Fig. 6

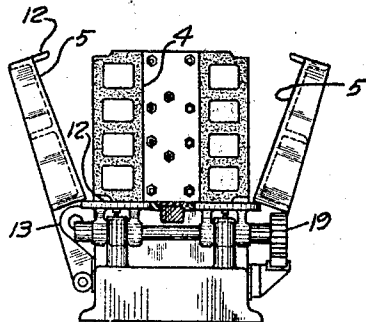


Fig. 7

INVENTOR
H. W. REEL
BY *L. A. Paley*
ATTORNEY

UNITED STATES PATENT OFFICE

HERBERT W. REEL, OF HINSDALE, ILLINOIS, ASSIGNOR TO THE UNITED STATES GYPSUM COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

TILE-FORMING MACHINE

Application filed March 25, 1929. Serial No. 349,914.

This invention relates to improvements in building materials and more particularly to machines for making long span roof tile.

One type of roof construction comprises supporting pre-cast calcined gypsum, cement or concrete tile between or upon the metal purlins or beams of the roof filling the joints between the tile with a binding medium, and covering the upper surface with a waterproofing composition.

It is the object of this invention to provide moulding machine for casting such tile either in the factory or on the job.

In describing this invention reference is made to the accompanying sheets of drawing which illustrate a preferred embodiment of the invention yet it is to be understood that minor detail departures may be made therefrom without departing from the scope of the invention.

In the drawings:

Figure 1 is a top plan view of a preferred form of the moulding machine constructed in accordance with this invention.

Figure 2 is a view in side elevation of Figure 1.

Figure 3 is a view in end elevation, looking at the right hand end of Figure 1.

Figure 4 is a view in transverse vertical section upon the lines 4—4 on Figure 2, looking in the direction of the arrows.

Figures 5 and 6 are similar views taken on the lines 5—5 and 6—6, respectively, on Figure 2.

Figure 7 is a view taken on the lines 7—7 Figure 2 showing two tiles in place about to be ejected.

The moulding machine constructed in accordance with this invention as illustrated comprises two horizontal stationary mould bottoms 1 extending toward each other from side frame members 2 supporting them above the floor, and a central movable member 3 extending from end to end of the mould forming the adjacent vertical sides 4 of the two mould bottoms, outer mould sides 5 normally vertical and hinged to the side frame members, and end members 6 having a sliding contact with the bottom and adapted to travel with said central member within the mould, secured to

the exterior end of said movable central member. The movable central member is mounted to travel upon a central track 7 between the mould bottoms extending beyond the end of the mould and that end is provided with vertical end closures 8 hinged below the mould bottoms similar to the outer mould sides 5.

The outer mould end members 6 carried upon the central movable member 3 are formed on the inner or mould side with vertically cut out portions, when it is desired to form tile with overlapping ends, as shown in Figure 1, and, when it is desired to mould tile with parallel longitudinal voids therein, the end members are provided with a plurality of apertures to receive and snugly slide over a plurality of fixed core poles 9 passing therethrough extending throughout the length of the tile to be moulded and rigidly secured at the outer end of the mould to a fixed plate 10 upon the end frame of the machine. When it is desired to mould a tile of less length than the mould, detachable mould ends 11 are mounted upon blocks adapted to rest upon the mould bottoms, as shown in Figure 1, and when desired to form tile with overlapping ends they are provided with vertical extensions extending within the mould, as shown, which mould ends abut the ends of the core poles 9. When it is desired to form the tile with recessed longitudinal corners on the upper side, strips 12 of the shape of the desired recess are secured upon the mould bottoms adjacent the outer hinged sides and similar strips are carried upon the upper or free edges of the hinged outer sides, as shown.

The hinged sides 5 are mounted on shafts carried in brackets 13 extending from the side frames below the mould bottoms by the vertical ribs or lugs 14 extending outward from the exterior of the sides which ribs are extended below the sides, pivotally mounted on the shafts and extended therebelow, the lower extremities of which are engaged by the ends of piston rods 15 extending from pneumatic or hydraulic cylinders 16 mounted below the mould bottoms which operate to swing the sides into vertical position to form mould sides or outward therefrom, as shown

in Figure 7, to release the moulded articles. The hinged mould ends 8 are provided with outstanding and depending ribs 17 secured upon a transverse shaft 18 mounted to turn in bearings extending outward from the end of the side frame, preferably by a gear wheel 19 secured at one end and engaged by a rack 2 carried on a piston rod of a pneumatic or hydraulic cylinder, 21 mounted on the side frame to swing the ends to vertical position to close the end of the moulds or outward thereof to a horizontal position to act as extensions of the fixed mould bottoms, as shown in dot and dash lines in Figure 2. The side frames 2 of the mould proper are extended outward from this end, but at a lesser height, and are provided with bearings adapted to mount transverse shafts of end pulleys 22 of endless belt conveyors 23 extending horizontally from the extremities of the mould ends 8 when in horizontal position, which belt conveyors may then ascend, descend or travel horizontally as shown over rollers 24 or pulleys provided therefor.

The central movable member 3 is provided with a central horizontal chamber 25 extending throughout its length similar to a piston cylinder which is closed at both ends and is provided with a central opening at its outer end adjacent the core pole retaining plate 10 with an aperture for receiving a piston rod, 26 also secured to the core pole retaining plate, which passes through a stuffing box about the sides of the end aperture and terminates in a piston head 27 adjacent the other end of the mould. The piston rod 26 is hollow and is provided with a vent adjacent the piston head leading into the surrounding space between the piston head and stuffing box and with a pipe connection, 28 to a source of pneumatic or hydraulic power leading from adjacent the other end between the retaining plate and stuffing box. Within the hollow piston rod a smaller pipe 29 leads from a source of pneumatic or hydraulic power through the outer end of the piston rod in the retaining plate 10 through the piston head and communicates with the space between the piston head and far end of the central cylinder.

Projecting from the extensions of the side frames 2 in front of the hinged ends 8 are rigid stops 30 for engaging the hinged ends 8 and holding them in open position. The stops 30 may have an adjustment 31 for varying the contact with the hinged ends 8 so that the latter may be horizontal or in the same plane as the mould bottoms 1, or may be inclined slightly upward from the mould bottoms 1, so that the tile as it rides up the incline will break the bond or connection it may have with the central movable member 3 which moves in a strictly plane direction.

The operation is as follows: Power being admitted through the small pipe 29 passing

through the piston rod the central member is caused to travel on its track between the fixed mould bottoms until its inward movement is completed, the end closing blocks 11 placed upon the mould bottoms in contact with the core poles, and the mould sides are rotated to closed position. The plastic material is then poured into the mould smoothed over flash with top edges, and allowed to set long enough to be self supporting without losing shape. Then the mould sides 5 are moved outward and the hinged ends 8 brought into slightly inclined or horizontal position by resting upon rigid stops 30 provided therefore extending upward from the reduced side frames. The end mould blocks 11 are removed and power admitted to the interior of the hollow piston rod which passing through the vent therein enters the cylinder 25 moves the central member upon track away from the core retaining plate 10 causing the green moulded tile to travel over the fixed mould bottoms, pass out of contact with the core poles 9 and onto the belt carriers 23 to be transported to drying sheds, drying rooms or other places at a distance from the mould. The mould end blocks 11 may be removed as above stated when the sides and ends are swung out or after that end of the moulded tile has been ejected. The parts are returned to the position first described and the operation repeated.

In the normal production of tile of various lengths the end plates 8 or blocks 11 may also be left in place as shown in Figure 2, and the end members 6 may be moved up the proper distance by means of the cylinder and piston in the movable member 3 and held in this position until the block of the desired length is made in the ordinary manner.

Tile of the full length of the mould may be formed by omitting the end blocks 11 above described, or may be formed in this mould of any shorter length desired by the use of said end blocks. Tile of any desired type of overlapping ends may be formed by forming the mould ends to the shape desired, likewise tile with sharp corners may be formed by omitting the corner depression forming strips 12 or any desired form of depression made by forming the strips to the shape desired. A single operator for filling the mould with the plastic material and controlling the power is all that is required to operate this machine.

What I claim is:

1. A moulding machine comprising a base supporting two parallel fixed mould bottoms, a central member mounted to travel between the mould bottoms normally acting on a division plate to form mould sides, mould sides hinged to the base on the outer sides of each mould bottom, mould ends carried on said central member, hinged mould ends to close the other end of the mould, and means to open the hinged mould sides and ends and

cause the central member to travel over the mould bottom to eject the moulded articles therefrom.

2. A moulding machine comprising a base supporting two parallel fixed mould bottoms, a central longitudinally movable division plate therebetween, mould sides hinged to the base on the outer sides of the mould bottom, fixed cores arranged parallel over each mould bottom, mould ends adapted to receive the core poles secured to the division plate, hinged closures for the other end of the mould and means to rotate the hinged members to open the mould and means to cause the division plate and mould ends carried thereby to travel along the mould bottoms to strip the core poles and eject the moulded articles.

3. A moulding machine comprising a base supporting two fixed parallel mould bottoms, a central longitudinal movable division plate therebetween, mould sides hinged to the base on the outer sides of the mould bottoms, mould ends carried on the movable division plate, a conveyor extending in prolongation of the mould bottoms, hinged mould ends adapted to be rotated to bridge between the ends of the mould bottoms and conveyor, and means to impart motion to the division plate to travel along the mould bottoms to strip the moulded articles therefrom and eject them upon the conveyor.

4. A tile moulding machine comprising a mould bottom, movable sides and ends, a conveyor in advance of the mould bottom, one of the ends being movable to bridge the gap between the bottom and the conveyor and inclinable slightly upward from the bottom, and power means for operating the opposite end to eject a moulded tile and to force it up the inclined end to break any bond with a horizontally moving part.

5. A tile moulding machine comprising a fixed mould bottom, a central movable member, movable mould ends a conveyor in advance of the bottom, a rigid support to hold one of the ends in a position to bridge the space between the bottom and the conveyor and inclined to the bottom, and power means to move the central member in stripping the mould and to engage a tile with the inclined end for breaking any bond with said central member.

6. In a tile moulding machine, the combination with a divided mould bottom, of a central movable member, movable mould sides and ends, a conveyor in advance of the bottom, one set of ends being movable to bridge the bottom and the conveyor; means for holding these ends in a position inclined from the bottom, and power means for operating the central member and the other set of ends to strip a tile from the bottom, to force it up the incline to break any bond be-

tween a tile and the central member, and to deposit a tile on the conveyor.

7. A moulding machine comprising a base supporting two spaced apart parallel fixed mould bottoms, a central division plate mounted to travel longitudinally therebetween, fixed core poles carried upon the base arranged parallel to each bottom extending into each mould, exterior sides for each mould hinged to the outer sides of the base, a common closure for the same ends of both moulds carried on the division plate having apertures for receiving the core poles, hinged closures for the other ends of each mould, a cylinder within the division plate, a piston rod entering therein having a piston head mounted upon its inner extremity and its outer extremity fixed to the base at the end with the core poles.

HERBERT W. REEL.